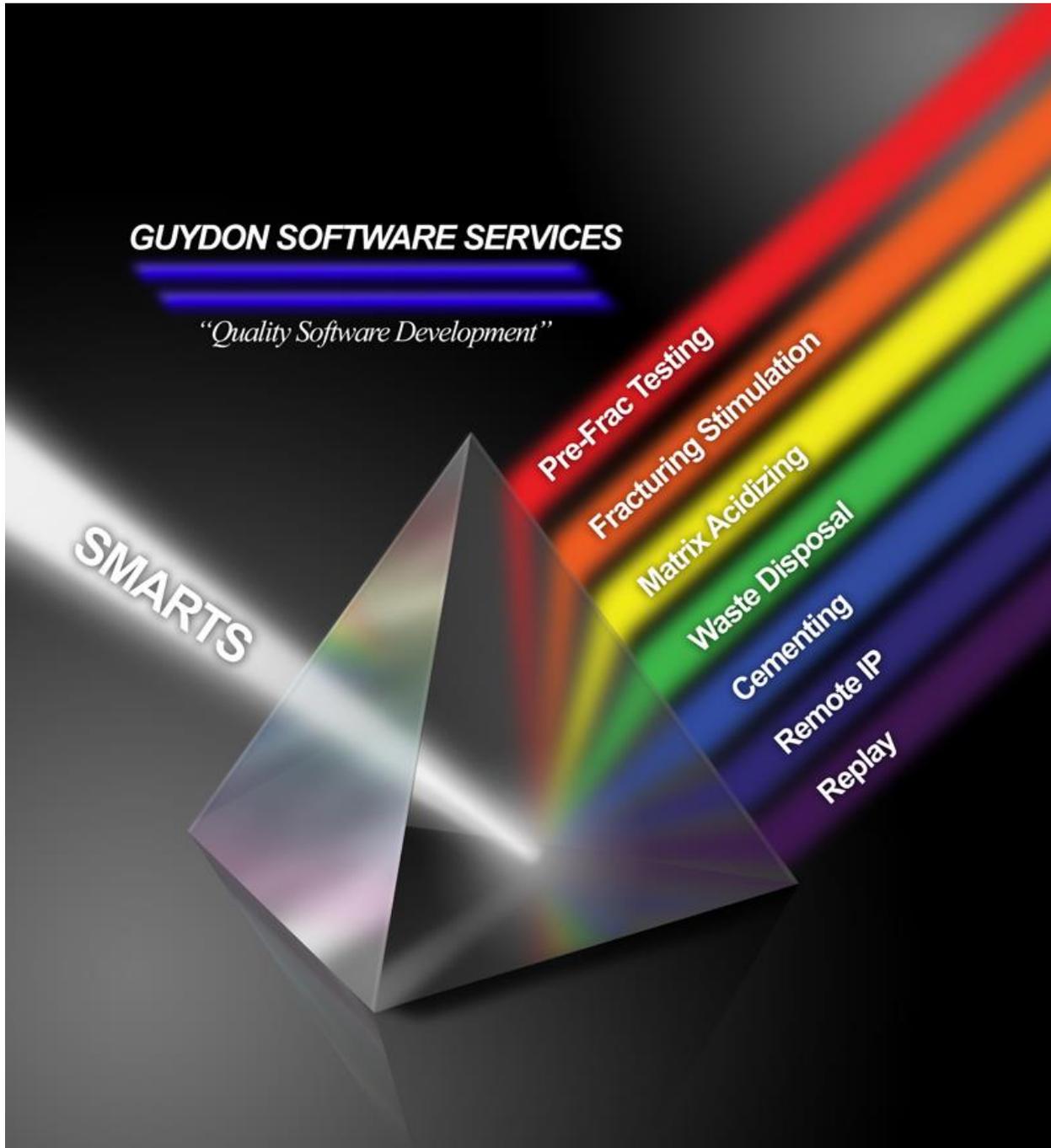


S.M.A.R.T.S.

Stimulation Monitoring and Reservoir Testing Software™



Guydon Software Services

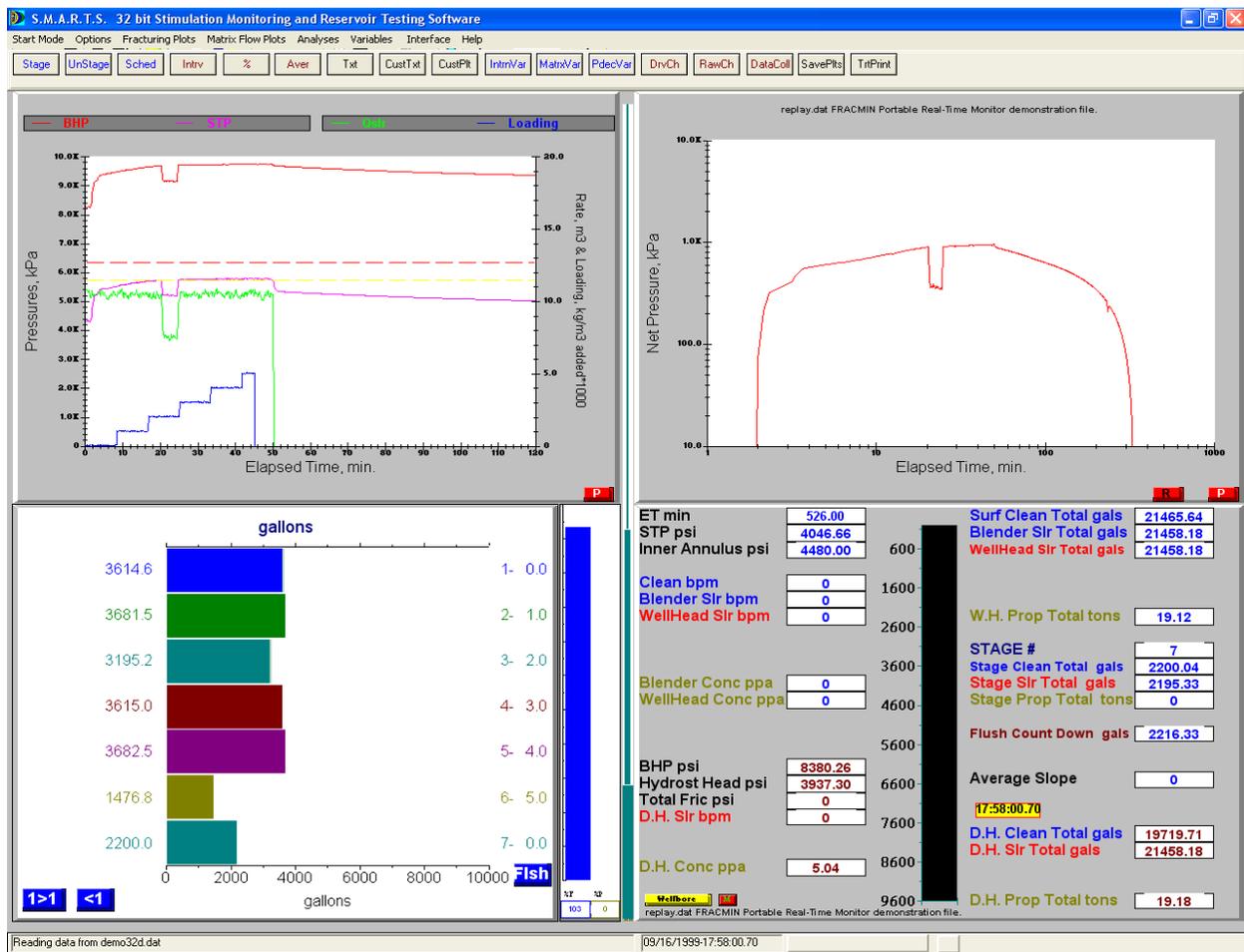
3813 Coronado Ct, Weatherford, TX 76087-9003

Office (817) 441-2575 Fax (817) 441-2576

S.M.A.R.T.S. Stimulation Monitoring and Reservoir Testing Softwaretm

Guydon Software Services SMARTS is a multifaceted software package. It has merged many of the industry accepted well pressure testing techniques for Matrix Acidizing and Hydraulic Fracturing Stimulation into a user friendly graphical format. Actual field data is utilized for the analyses and can be monitored either real time, or submitted to SMARTS via an ASCII file format, allowing replay and analysis in an office environment.

SMARTS allows quality control comparison of hypothetical design objectives to actual job application, closing the technology loop between design and what is achieved, as well as providing insight on improving design based on actual analysis of field results.



Fracturing Analyses

- Step Rate
- Perforation Analysis
- Pump-In Flow Back
- Pressure Decline
- Net Pressure Analysis

Matrix Acidizing

- Step Rate Initial Skin
- Evolving Transient Skin

Bottom Hole Pressure, Friction & Hydrostatics Determination

Bottom Hole Pressure can be calculated or measured directly.
Slurry Fluid Front Density Tracking for Hydrostatic & Friction Adjustment.

Well Configuration

Variable treating strings

Multiple friction models and fluid friction database

Treating String Segments				
	I.D. in.	End Meas. ft.	Fluid Fric.	Dev. Deg.
1	4.890	6638.00	DodgeMetz	0.00
2	4.890	8970.00	DodgeMetz	90.00
3	4.890	9637.00	DodgeMetz	90.00
4	0.000	0.00		0.00
5	0.000	0.00		0.00
6	0.000	0.00		0.00

Friction and Hydrostatics

Use Dodge Metzner Friction Model

Select Fluid Friction Fit Data

Curve Fit Fluid Friction Data

Measured Depth to Perfs: 9637.00 ft.

True Vertical Depth to Perfs: 8123.00 ft.

Perf Diameter: 0.330 in.

Static Strings True Vert. Depth: 0.00 ft.

Static Strings Fluid SpGr.: 0.00

OK Cancel Help

Formation Information

Formation database

Formation Properties

Formation Name

CottonValley(lower) Add Formation

Matrix Acidizing Properties

Pre-Frac and Fracturing Properties

OK Cancel Help

Staging Information

Variable fluid and proppant types database, as well as friction model selection per stage.

	Fluid Name	Stage gal.	lbm/gal.	n'	k'lbs^n'/ft^2	Fluid Spgr.	Prop Spgr.	Prop Type	Friction Model	%Friction
1	Water	420.00	0.00	1.000	0.0000500	1.010	2.650	NONE	DodgeMetz	33.000
2	H2O2	4200.00	0.00	1.000	0.0000500	1.010	2.650	NONE	DodgeMetz	33.000
3	Water	420.00	0.00	1.000	0.0000500	1.010	2.650	NONE	DodgeMetz	33.000
4	6%HCL	4200.00	0.00	1.000	0.0000500	1.010	2.650	NONE	DodgeMetz	33.000
5	DivSurf	2394.00	0.00	1.000	0.0000500	1.010	2.650	NONE	DodgeMetz	33.000
6	Water	420.00	0.00	1.000	0.0000500	1.010	2.650	NONE	DodgeMetz	33.000
7	H2O2	4620.00	0.00	1.000	0.0000500	1.010	2.650	NONE	DodgeMetz	33.000
8	6%HCL	4200.00	0.00	1.000	0.0000500	1.010	2.650	NONE	DodgeMetz	33.000
9	Water	4158.00	0.00	1.000	0.0000500	1.010	2.650	NONE	DodgeMetz	33.000

Communications

All major service companies support the SMARTS interface allowing a laptop or ultra light computer to receive data via a single RS-232 or IP input. SMARTS supports RS-232 or IP transfer of information to other computers, allowing other on-site products to be executed. Remote RS-232 or IP modem communication is supported, allowing cost effective remote monitoring.

Real-Time Plots:

A simultaneous plot of the following parameters can be generated during monitoring or replay versus elapsed time, if the proper transducers are provided.

Surface Treating Pressure & Down Hole Pressure (Direct, Calculated, or Static String derived).

Real Time fully compressible foam model for down hole pressure and foam quality.

Total Pump Rate or Wellhead Rate & Proppant Concentration.

X-Linker rate, pH of gel, Temperature of gel, Viscosity of gel.

A wellbore stage fluid displacement plot showing current stage(s) position in the treating string.

A net pressure or fracturing pressure plot vs. the log of elapsed time.

A staging bar graph plot showing design versus actual stage fluid volumes.

Pressure versus Square Root of Time, Pressure versus Rate.

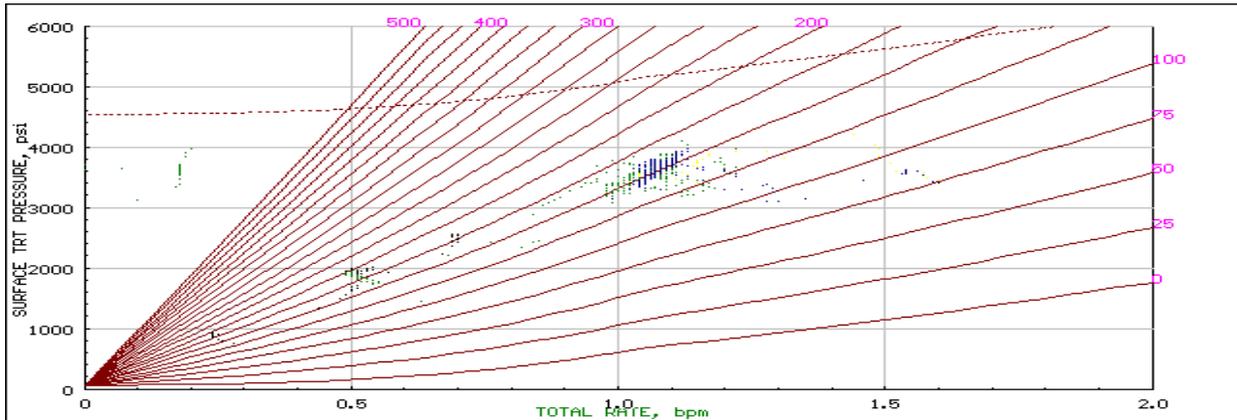
Pressure Decline Leak-off analysis.

Paccaloni Initial Skin Step Rate & Transient Skin versus time or volume/height analyses.

Additives quality control.

Real-time Matrix Acidizing Initial Skin Step Rate Analysis

Initial Skin Determination
Permeability Matching



Keyboard commands are active. Type 'Q' to quit.

Real-Time Mini-Frac Pressure Decline Analysis

Step Rate analysis for fracture extension, and closure pressure as well as extension rate. Total in-situ leakoff determination for PKN, GDK, and Radial models. Fluid efficiency for PKN, GDK, and Radial models, both pressure and closure time based. Closure Determination via various methodologies. Created fracture length and width or radius.

Pressure Decline Values

Date and Time: 11/08/2007-14:39:24
Datafile: C:\Smarts\DataDir\replay.dat

Input Data:

- Pumping time: 50.00 min.
- N-prime of fluid: 0.50000
- Viscosity exponent of fluid: 1.0
- Closure Time (Entered): 185.000 min
- Closure pressure of formation: 8800.0 psi
- Down Hole Instantaneous Shut-In Pressure: 9184.5 psi

Calculated Data:

- Type Fit: G Function
- Pstar: 211.47 psi
- Fluid efficiency (based on closure time): 66.2 %
- Fluid efficiency (based on pressure): 45.2 %
- PERKINS & KERN: 49.7 %
- RGD/RADIAL: 49.7 %

LEAKOFF COEFFICIENT/FRACTURE GEOMETRY CALCULATIONS

Input Data:

- Gross fracture height: 100.0 ft.
- Net pay height: 100.0 ft.
- Young's modulus: 5.500000e+06 psi.
- Poisson's ratio: 0.21000
- Fluid Volume Pumped on Formation: 21458.19 gal

Calculated Data:

Fracture Geometry	Ave. Width (in.)	to TIP Length (ft.)	Total Ct (ft./min. ^{0.5})
PERKINS & KERN	0.0687	1133.4	0.0003119
RGD	0.4403	194.2	0.0018167
RADIAL	0.2052	162.9	0.0008466

ANALYZED VALUES

ISIP's

- Surface = 0.00 psi
- Down Hole = 9184.50 psi

Slopes

- Net Pressure (Picked) = 0.00
- Net Pressure (Current) = 0.00

Net Pressure Limits (Estimated!)

- Yellow NetP(0.00) BHP(8800.00) psi Reached in = 0.00 min
- Red NetP(0.00) BHP(8800.00) psi Reached in = 0.00 min

Step Rate Results

- Extension Rate = 0.00 bpm
- Extension Pressure = 0.00 psi
- Closure Pressure (@Zero Rate) = 0.00 psi
- Frac Gradient = 0.00
- Permeability = 0.00 md Height = 0.00 ft
- Skin = 0.00

Closure Results

- SQRT = 9027.95 psi Time = 195.83
- Horner = 8882.10 psi Time = 251.89 min
- Leak = 8874.25 psi Time = 251.00 min

Leak Off Results

- MasterFit PKN = 0.000000 GDK = 0.000000 Radial = 0.000000 ft/min^{0.5}
- Gfunction PKN = 0.000312 GDK = 0.001817 Radial = 0.000847 ft/min^{0.5}

Perforations

- Average # Open = 0

Post-Analysis Plots and Reports

The job file can be replayed with all the features available during actual job monitoring.

Net pressure versus time or volume plots.

Singular parameter plots of any recorded parameter versus another. Allows pressure digitizing.

Plot of up to six parameters vs. another allowing six parameters to be viewed simultaneously.

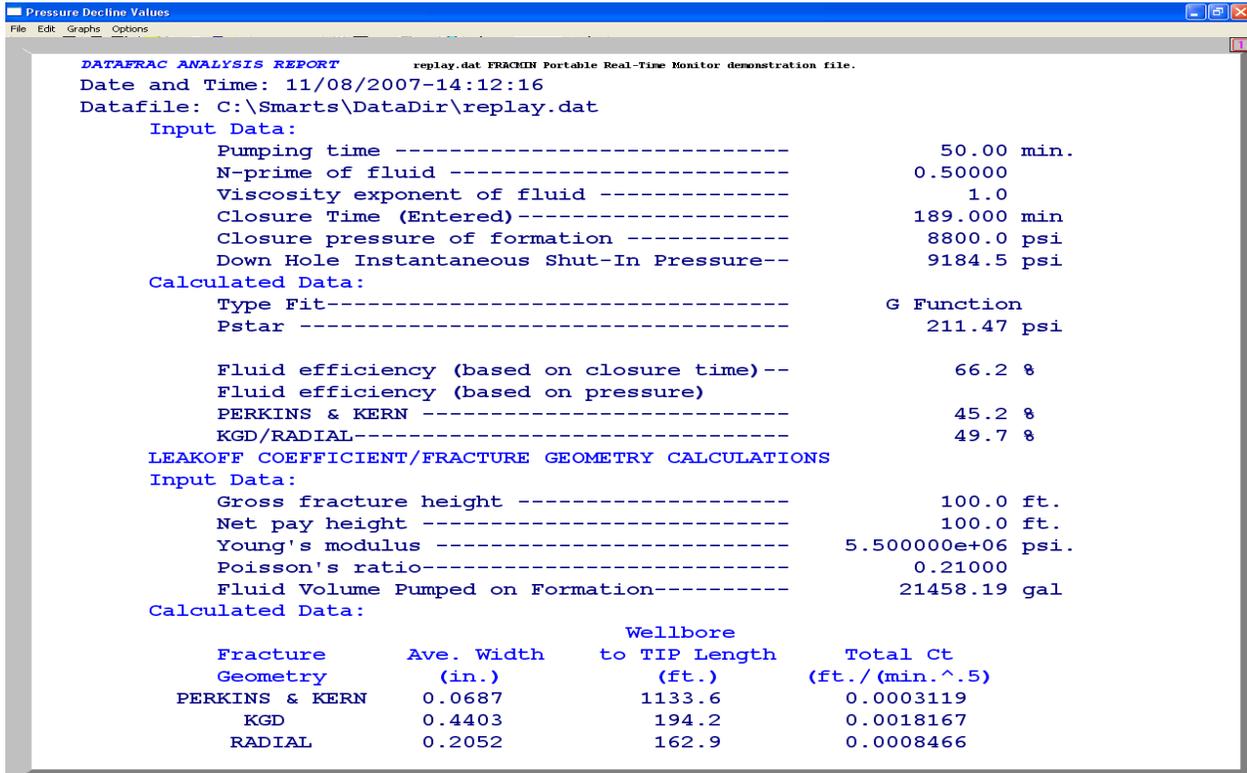
Step rate analysis plot for extension and closure determination.

Square root of time plot for closure determination.

Pressure decline & G-function analyses for leak-off and fluid efficiency determinations.

A data lister allowing any combination of parameters to be printed or stored to file.

Post-job replay features allow key parameters to be re-calculated as well as all analyses to be performed.



For further information contact:

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